



# Vibration Measurements at TTF

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Technology Working Group



# Topics

- Sensors
- The new Hardware and Software
- Status
- Some first Data

Hardware: E. Gadinkel, O. Savlanski, M. Stolper  
Software: M. Lomperski



# Sensors and Amplifiers

## ■ Piezoelectric Accelerometer

### □ Different types used

- Brüel & Kjaer 8318
- Endevco 7703/1000

### □ Charge sensitivity 70 to 100 pC/(m/s<sup>2</sup>)

### □ Operate at He Temp with reduced sensitivity (~1/3)

## ■ Amplifier

### □ Brüel & Kjaer Charge Amplifier 2635

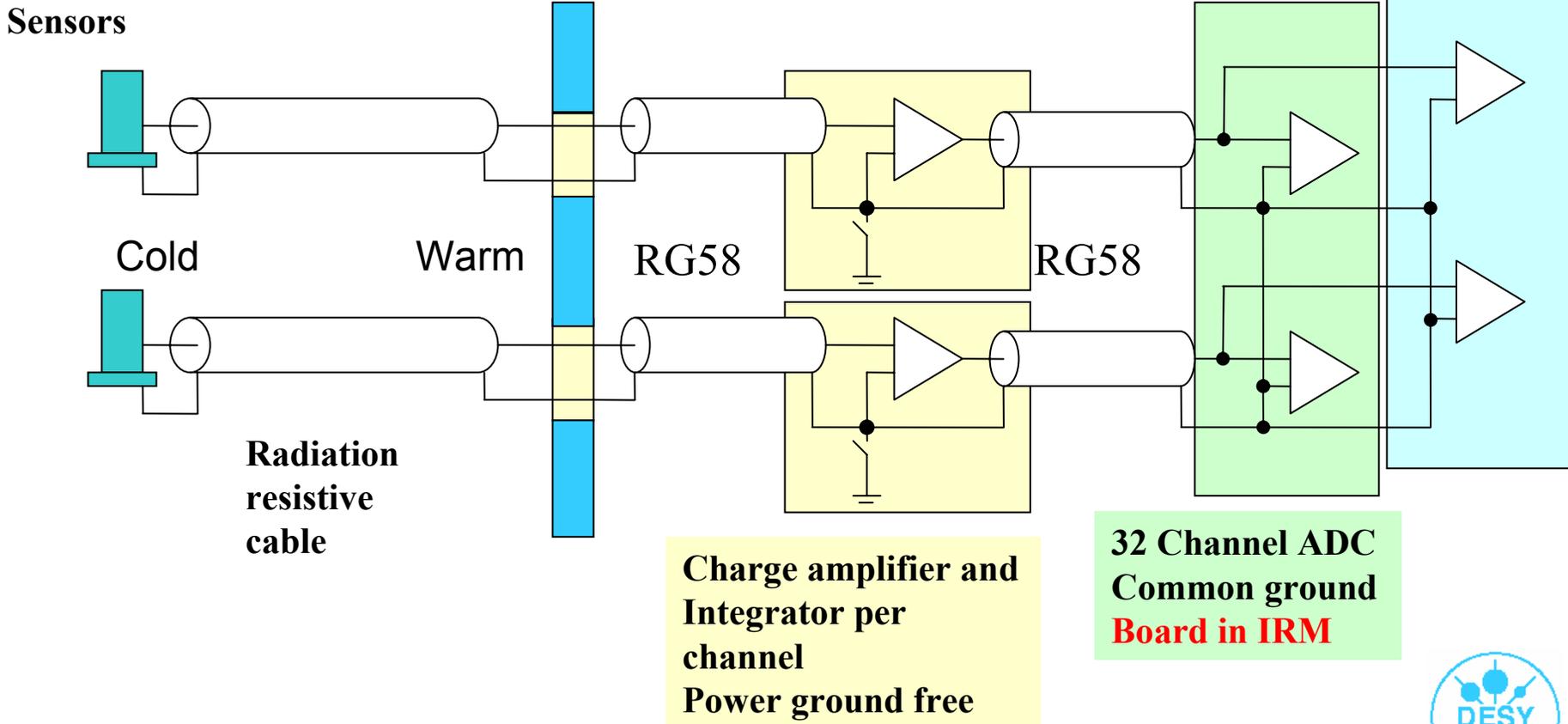
- Older type used at TTF (single Channel)
- New type used for tests (double channel)



# Sensor Connection to Amplifier and ADC

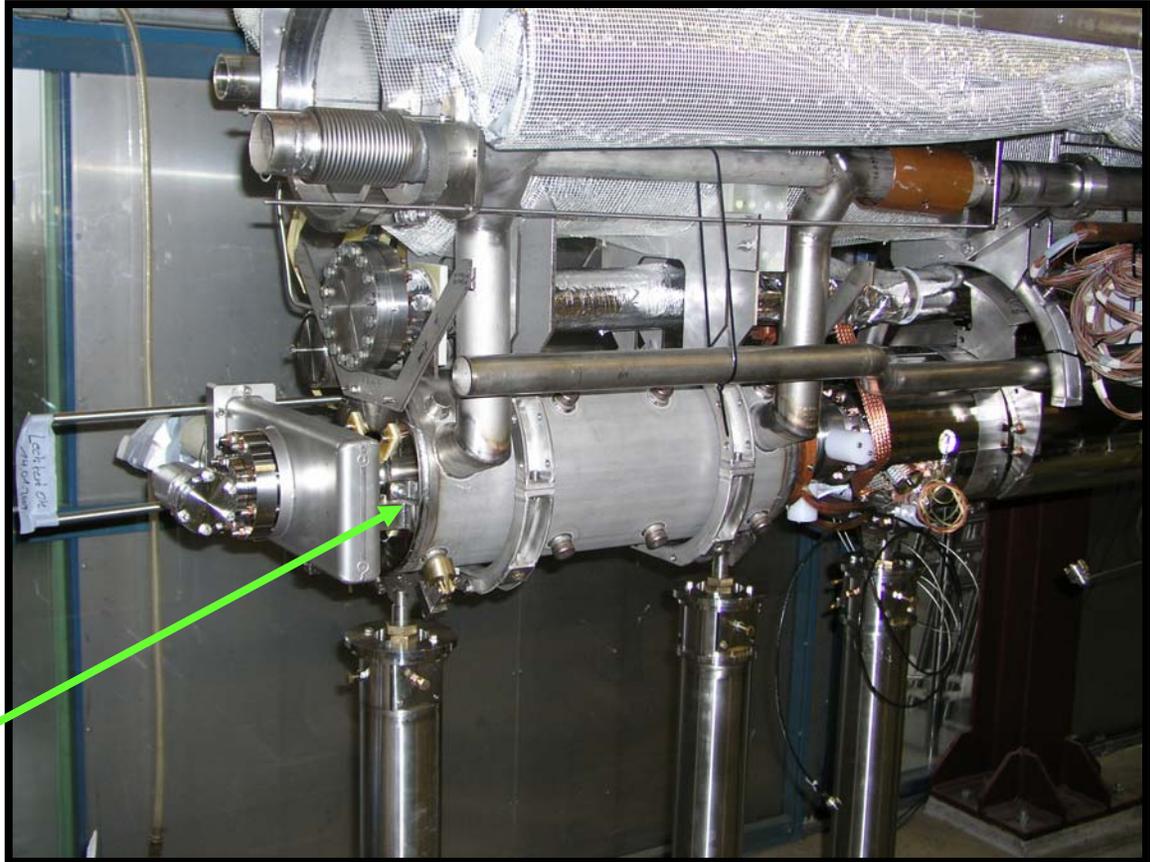
8 Channel ADC with USB Interface

Flange with Feed through SMA

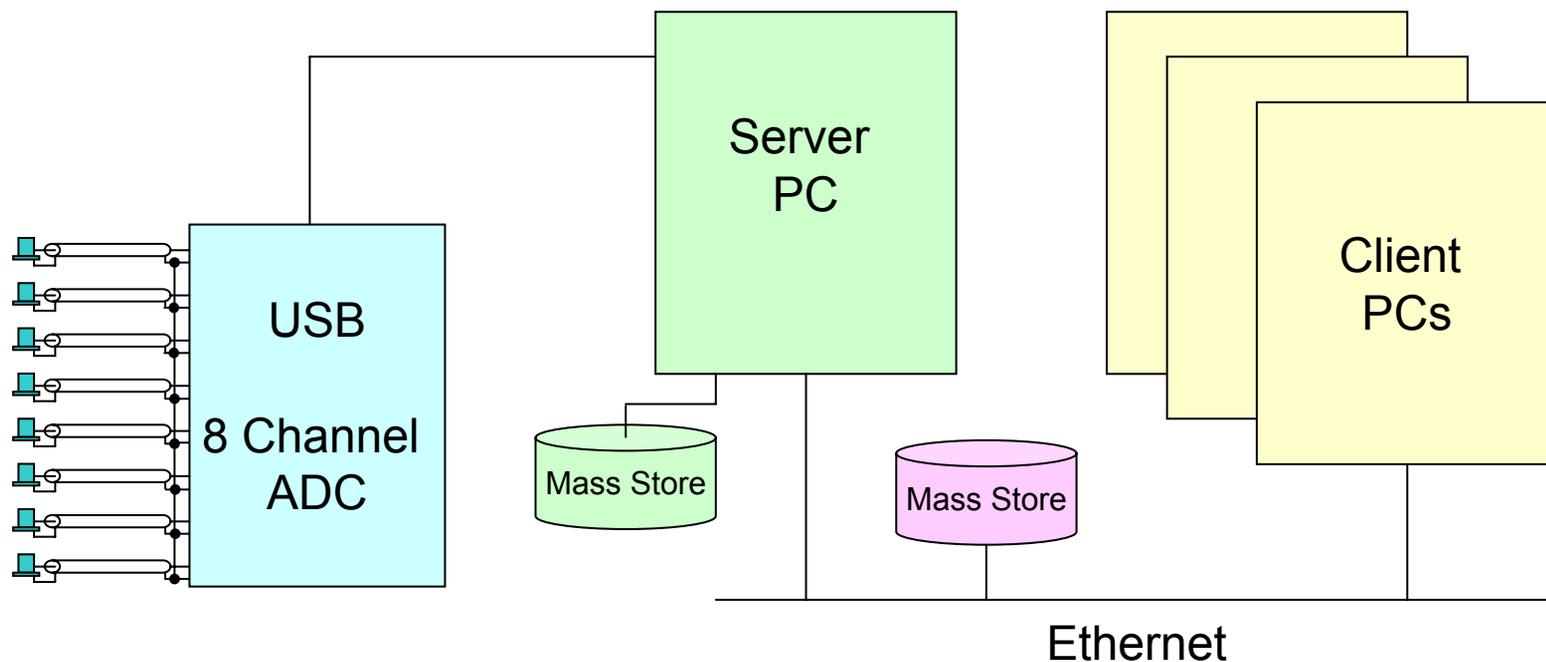


# Location of Sensors

- Each TTF module is equipped with two Sensors
- Sensors mounted to the endplate of the Quadrupole
  - Vertical
  - Horizontal



# New Data Acquisition System



Data acquisition with Visual Basic

# Software

- Data Acquisition by Mark Lomperski
  - Rate up to 1 kHz over long times
  - Continuously stored data
  - Online display
  - Data archived on mass store
  - Files (.csv) for analysis available
- Minor improvements needed



# Server PC

The screenshot shows a Windows XP desktop environment. The desktop background is blue with the text "ACCXPTTFVIBES" repeated. A taskbar at the bottom shows the Start button, several icons, and the system tray with the time 09:39.

Two application windows are open:

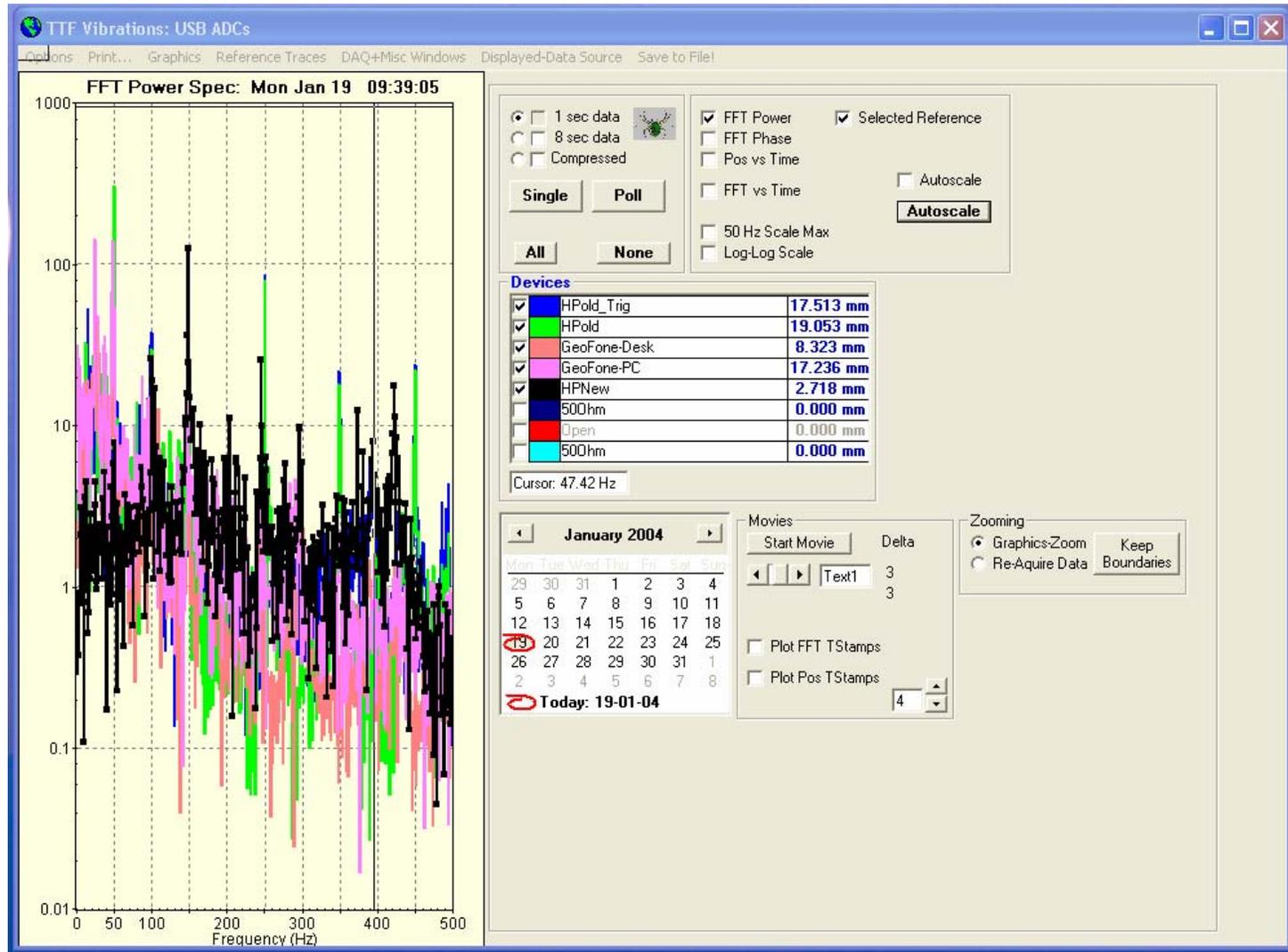
- Watchdog**: A window titled "Watchdog" with a "Log" tab. It shows a table of processes:
 

Process	Status	Date
1:\server\UibrADCs.exe	STARTED	2004-01-19 09:23:16

 Below the table are buttons for "Add...", "Attach...", "Save config", "Process Details...", "About watchdog...", "Remove", "Start process", "Stop process", "Load config", "Reboot", and "Stop watchdog".
- TTF Vibrations: USB ADCs**: A window titled "TTF Vibrations: USB ADCs" showing a plot of vibration data. The plot has a y-axis from -2.5 to 2.5 and an x-axis from 0 to 1200. The data shows a complex, oscillatory signal. To the right of the plot are controls for "Gain - Factor" (set to 2) and "Active Channels" (checkboxes for 0-7). Above the plot, there are fields for "Server Errors" and "ADC Errors", and a "Drawing" label with the value "0".



# Client



# Preamplifier, Piezzo sensor and Geophone, outside TTF, floor



# Some preliminary data

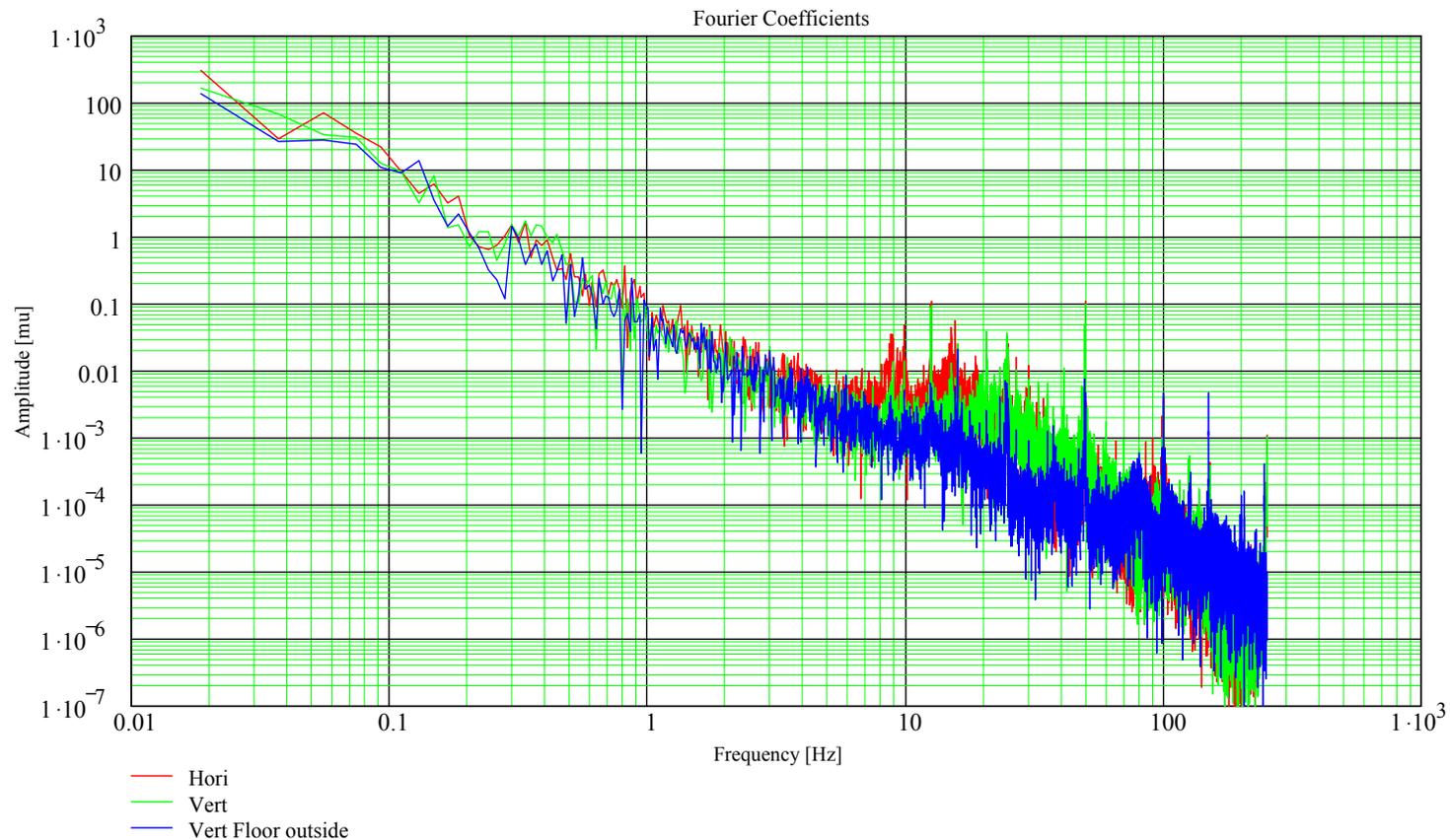
- Some first data were taken last weekend
- Analysis has started
  - More time needed for checking and comparing
  - Comparison with data from the geophone
  - Correlations need to be added



# Fourier Spectrum

ACC2 horizontal, vertical  
Vertical outside TTF Tunnel on floor

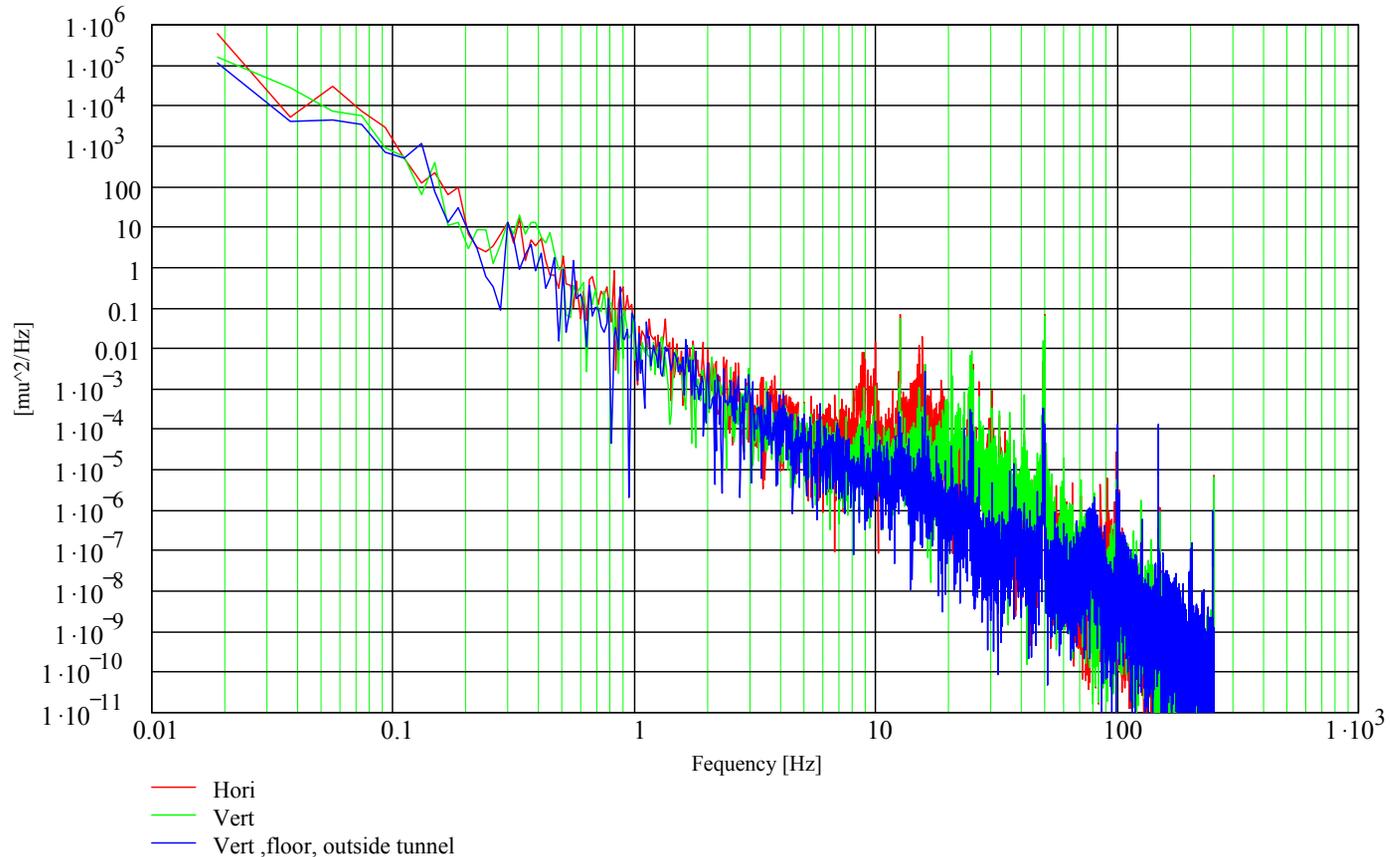
Preliminary!



# Power Spectrum

ACC2 horizontal, vertical  
 Vertical outside TTF Tunnel on floor

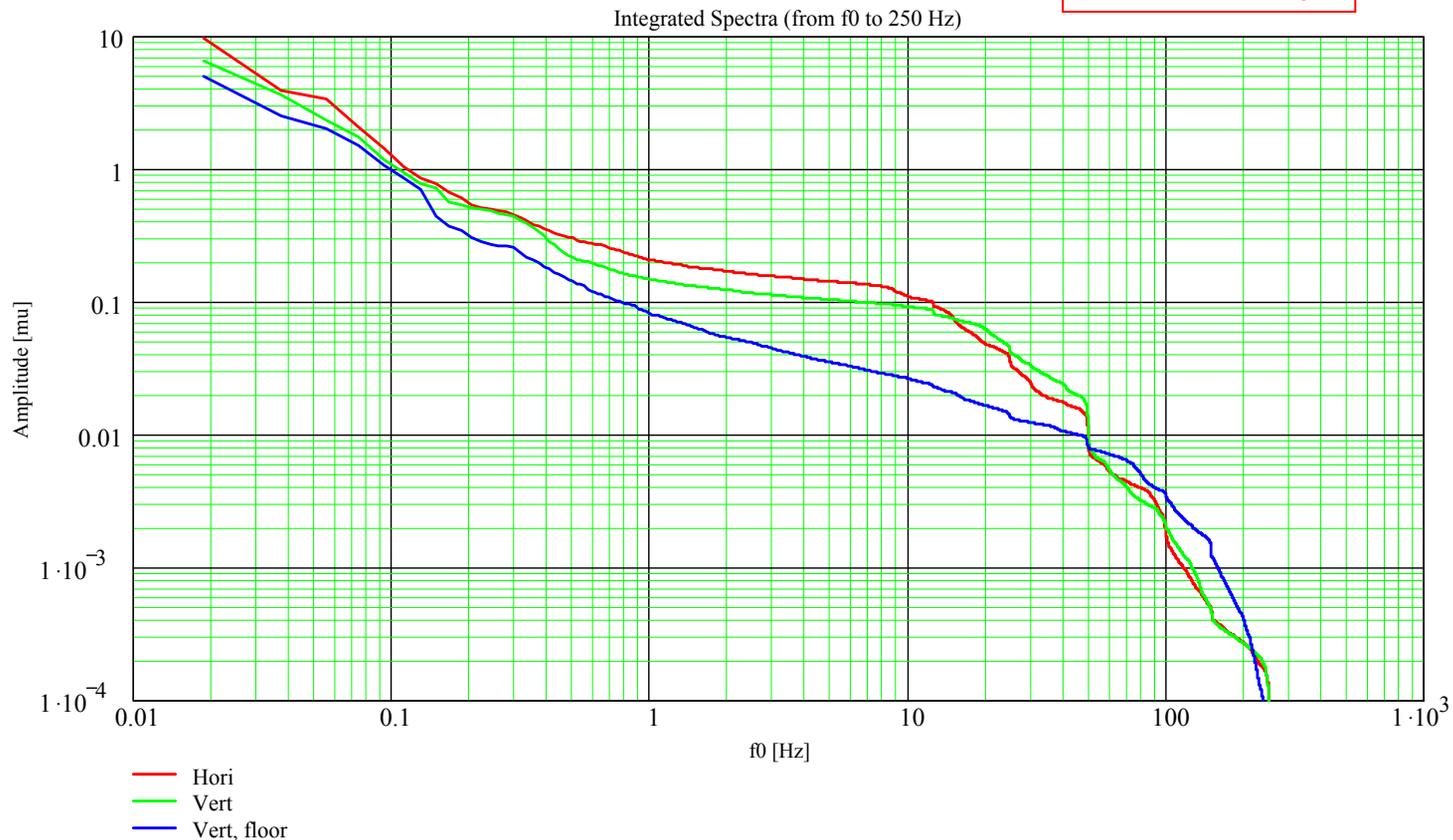
Preliminary!



# Integrated Spectrum

ACC2 horizontal, vertical  
 Vertical outside TTF Tunnel on floor

Preliminary!



# Summary

- Cabling improved to reduce noise
- New Data Acquisition System running
- Data taking (without TTF operation) has started
- Analysis must be checked and improved
- Aim to be ready for the next run
- All modules equipped with x,y sensors then

